U.S. Department
of Transportation
**Federal Aviation
Administration**

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Heliport Noise Modeling Report: Model Review and Program Plan

The Federal Aviation Administration (FAA) is responsible for development, maintenance, and support of models and tools for assessing and predicting aircraft noise. *The Heliport Noise Modeling Report: Model Review and Program Plan* reflects the FAA's continuing efforts to provide state-of-the art rotary-wing aircraft noise model capabilities. The FAA currently supports two primary models for evaluating aircraft noise. The Integrated Noise Model (INM, Version 6.0 released September 1999) which predicts noise levels for fixed wing aircraft operations, and the Heliport Noise Model (HNM, Version 2.2 released February 1994) which predicts noise resulting from rotary-wing aircraft operations. In addition, NASA, in cooperation with the Department of Defense, has developed the Rotorcraft Noise Model (RNM, Version 1.0 released October 1999), designed to model tiltrotor operations not possible with HNM.

The Heliport Noise Model is a DOS-based program last released in February 1994. Since this date, no updates have been performed and at least one HNM user outside the United States has reported that HNM no longer functions on his version of the DOS operating system. There are also no programs in place for collecting HNM source data, nor is there a capability to add new helicopters to HNM without code changes to the system. For these reasons, the FAA has begun a series of projects to update the current modeling system. Previous work efforts on HNM focused exclusively on integrating the present HNM into the INM Windows Graphical User Interface program. It did not address the strategic issues associated with maintaining and updating source data or the necessary standards documents necessary for communicating with Industry. Also, FAA requirements concerning helicopter noise modeling have changed largely due to NASA's development of RNM.

It is necessary therefore to evaluate various ideas supporting rotorcraft modeling for environmental studies, such as

- Integrating the HNM or RNM model into INM software,
- Combining HNM or RNM output with INM output,
- Converting RNM data for use within HNM,
- Determining HNM and RNM data acquisition requirements, and
- Promoting heliport noise modeling standards.

The purpose of the current project is to perform a model review, develop a program plan and to begin developing supporting software that will eventually provide a fully integrated fixed and rotary wing modeling capability. For this phase, software development and modifications include:

- A recompilation of HNM 2.2 using current compilers
- Development of software to link HNM to NMPLOT

- Modification to INM 6.0a to support combining NMPLOT contours developed from either the new Rotorcraft Noise Model (RNM) or the current version of HNM 2.2

This phase of the project also identifies software changes necessary to add new helicopters to the existing HNM and began the design necessary to combine the core noise calculation engines of the current INM with a new helicopter-specific noise calculation engine. This new core noise calculation engine will be developed first as a research and development version that will be expanded based on research and development efforts associated with the Rotorcraft Noise Model described above.

In conclusion, much of the first phase was devoted to learning the RNM development history, the Federal commitment to support the model, it's use within industry, becoming acquainted with using the model, and developing procedures for combining RNM and INM noise calculations. Under any implementation scenario users will be able to combine RNM and INM results, if desired, and such a procedure was developed for this phase of work.

For additional information or answers to questions on the *Heliport Noise Modeling Report: Model Review and Program Plan* please contact the AEE Noise Division at 202-267-3493 (phone) or 202-267-5594 (fax).